

(19)



Europäisches Patentamt

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(11)

EP 0 958 731 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.11.1999 Bulletin 1999/47

(51) Int. Cl.⁶: **A01D 78/10**

(21) Application number: **99201435.7**

(22) Date of filing: **07.05.1999**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **20.05.1998 NL 1009224**

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(54) An implement for laterally displacing crop lying on the soil

(57) An implement for laterally displacing crop lying on the soil, which implement comprises rake members (4, 5, 11, 12) that are driven mechanically so as to be rotatable about upwardly orientated axes, which rake members, seen in the direction of travel, are arranged in at least two groups of at least two rake members, said groups being disposed one behind the other, the outer

rake members of each group rotating in opposite directions, the distance between the axes of rotation of the outer rake members (4, 5) of the leading group being smaller than the distance between the axes of rotation of the outer rake members (11, 12) of the group of rake members disposed therebehind.

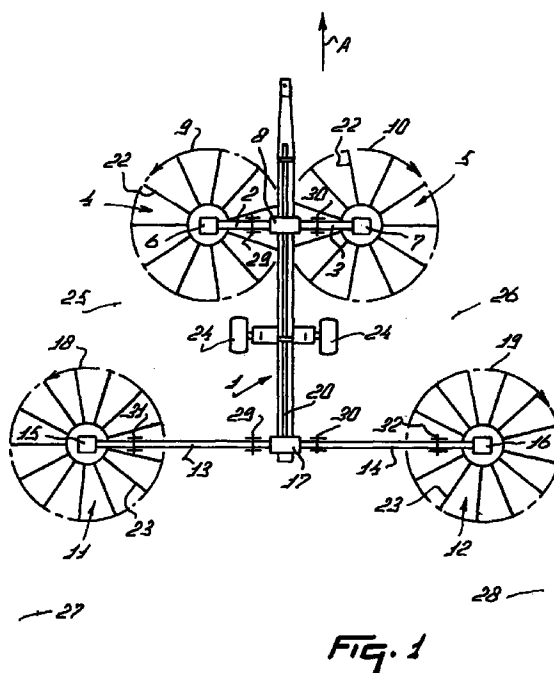


Fig. 1

EP 0 958 731 A1

Description

[0001] The invention relates to an implement for laterally displacing crop lying on the soil, which implement comprises rake members that are driven mechanically so as to be rotatable about upwardly orientated axes, which rake members, seen in the direction of travel, are arranged in at least two groups of at least two rake members, said groups being disposed one behind the other, the outer rake members of each group rotating in opposite directions.

[0002] Such an implement is known e.g. from European patent application 0 819 372.

[0003] In this known implement the crop is raked from the outside to the inside, in such a manner that in the centre of the implement there is created a swath.

[0004] A disadvantage of this known implement is that the working width is rather limited.

[0005] The purpose of the construction according to the invention is inter alia to obviate this drawback.

[0006] According to the invention the distance between the axes of rotation of the outer rake members of the leading group is smaller than the distance between the axes of rotation of the outer rake members of the group of rake members disposed therebehind. Preferably the directions of rotation of the outer rake members of each group are opposite to each other in such a manner that in plan view the outer rake members which, seen in the direction of travel, are located on the left-hand side of the implement rotate anticlockwise and the outer rake members which, seen in the direction of travel, are located on the right-hand side rotate clockwise.

[0007] In accordance with a further aspect of the invention, seen in the direction of travel, two groups of running wheels are disposed between the rake members, the distance between the outer lateral sides of the running wheels being smaller than the distance between the outer lateral sides of the paths described by the tines of the outer rake members of the leading group. In this manner a proper and balanced support of the implement can be obtained.

[0008] The invention will be set out in further detail on the basis of an exemplary embodiment, while some more advantages of the implement will be mentioned.

[0009] Figure 1 is a plan view of the implement.

[0010] The implement according to the invention is provided with a frame beam 1 extending in the direction of travel A and capable of being coupled at its front side to a tractor.

[0011] On the left-hand side of the frame beam 1 there is fitted a frame beam 2 and on the right-hand side thereof a frame beam 3, both extending transversely to the direction of travel. Each of these frame beams 2 and 3 carries at its free end a rake member 4, 5 respectively rotating about an upwardly orientated axis.

[0012] The rake members are provided with gearboxes 6, 7 respectively whose drive is coupled with a

transmission box 8 disposed on the frame beam 1 via intermediate shafts that are preferably located in the frame beams 2 and 3.

[0013] The drive of the rake members 4 and 5 is such that the rake member 4 rotates anticlockwise and the rake member 5 rotates clockwise. The distance between the axes of rotation of the rake members 4 and 5 is such that, in plan view, the outer tine paths 9, 10 respectively are close to each other and preferably are tangential or intersect.

[0014] In the latter case, of course, the tines of one rake member should be arranged relative to the tines of the other rake member so as not to come into contact with each other when rotating.

[0015] The implement further comprises a second group of rake members 11, 12 respectively which, seen in the direction of travel, are fitted behind the first group of rake members to a frame beam 13, 14 respectively disposed transversely to the direction of travel. Like the rake members 4 and 5, these rake members are each driven about an upwardly orientated shaft. (These rake members are designed in a manner known per se; the Lely Hibiscus can be mentioned as an example thereof.)

[0016] The frame beams 13, 14 respectively are fastened to the frame beam 1. Above each rake member 11, 12 respectively there is disposed a gearbox 15, 16 respectively via which the rake members 11, 12 respectively are each driven by means of intermediate shafts, located in the frame beams 13, 14 respectively, and a centrally located transmission box 17.

[0017] The direction of rotation of the rake member 11 corresponds to that of the rake member 4 and the direction of rotation of the rake member 12 corresponds to that of the rake member 5. The distance between the rake members 11 and 12 is such that, seen in the direction of travel A, the outermost left-hand part of the left-hand side of the tine path 9 of the rake member 4 overlaps the outermost right-hand part of the right-hand side of the tine path 18 of the rake member 11. Likewise, seen in the direction of travel A, the outermost right-hand part of the tine path 10 of the rake member 5 overlaps the outermost left-hand part of the tine path 19 of the rake member 12.

[0018] By means of an intermediate shaft 20 the transmission box 17 is coupled with the transmission box 8 which can be coupled itself, via one or more intermediate shafts 21, with the non-shown drive shaft of the tractor.

[0019] The rake members 4, 5 respectively have less tine arms 22, eleven in this embodiment, than the rake members 11, 12 respectively, which are each provided with thirteen tine arms 23 in this embodiment.

[0020] To each tine arm two downwardly extending tines are fastened in a manner known per se.

[0021] To the frame beam 1, between the two groups of rake members, there is disposed a pair of running wheels 24 for supporting the frame and the rake members. Seen from above, the running wheels are prefera-

bly located in or near the centre of gravity of the implement.

[0022] The implement operates as follows.

[0023] The machine functions as a rake and the rake members 4 and 5 displace the mown crop (usually grass) lying on the soil to the left, to the right respectively, so that on the left-hand side, on the right-hand side respectively of the group of rake members 4 and 5 there is created a swath 25, 26 respectively.

[0024] Seen in the direction of travel A, these swaths 25, 26 respectively are located before the rake members 11, 12 respectively which, as a result thereof, displace the crop lying before the rake members together with the swath to the left, to the right respectively, so that eventually both on the left-hand side and the right-hand side of the implement there is created a large swath 27, 28 respectively.

[0025] The rake members 11, 12 respectively have to displace more crop than the rake members 4, 5 respectively and for that reason have more tine arms provided with tines than the rake members 4, 5 respectively.

[0026] The distance between each of the running wheels 24 of the frame beam 1 is such that the running wheels, seen in the direction of travel A, move on the raked soil and are consequently located between the swaths 25 and 26.

[0027] The distance measured between the swaths 27 and 28 transversely to the direction of travel A may amount to approximately 15 m when the machine is provided with normal rake members having a diameter of approximately 3.60 m.

[0028] When the implement moves over the field in a given direction and returns, so that crop is added to the previously created swath on the outside thereof, there is formed a swath having a width of approximately 2 meters.

[0029] For being brought into a transport position, if required, the first group of rake members 29, 30 can be pivoted upwards about pivotal axes 29, 30 orientated in the direction of travel A. Likewise, for the purpose of being brought into a transport position, the rake members 11, 12 respectively can be pivoted upwards about axes 31 and 32 orientated in the direction of travel A.

[0030] In this embodiment the rake members rotate in such a manner that a swath is formed on the left-hand side, the right-hand side respectively of the rake members 11, 12 respectively.

[0031] However, the invention also relates to an implement in which the rake members have an opposite direction of rotation, so that a swath is created in the centre of the implement.

[0032] The invention is not restricted to the conclusions but also relates to what has been described in the foregoing and to all the details in the drawings.

Claims

1. An implement for laterally displacing crop lying on

the soil, which implement comprises rake members (4, 5, 11, 12) that are driven mechanically so as to be rotatable about upwardly orientated axes, which rake members, seen in the direction of travel, are arranged in at least two groups of at least two rake members, said groups being disposed one behind the other, the outer rake members of each group rotating in opposite directions, characterized in that the distance between the axes of rotation of the outer rake members (4, 5) of the leading group is smaller than the distance between the axes of rotation of the outer rake members (11, 12) of the group of rake members disposed therebehind.

2. An implement as claimed in claim 1, characterized in that the directions of rotation of the outer rake members (4, 5, 11, 12) of each group are opposite to each other in such a manner that in plan view the outer rake members (4, 11) which, seen in the direction of travel, are located on the left-hand side of the implement rotate anticlockwise and the outer rake members (5, 12) which, seen in the direction of travel, are located on the right-hand side rotate clockwise.
3. An implement as claimed in any one of claims 1 or 2, characterized in that, seen in the direction of travel, there are arranged two groups of running wheels (24) between the rake members (4, 5, 11, 12), the distance between the outer lateral sides of the running wheels (24) being smaller than the distance between the outer lateral sides of the paths described by the tines of the outer rake members (4, 5) of the leading group.
4. An implement as claimed in any one of the preceding claims, characterized in that the rake members (4, 5) of one group have an other number of tine arms than the rake members (11, 12) of the other group.
5. An implement as claimed in claim 4, characterized in that the rake members (4, 5) of the leading group have less tine arms than the rake members (11, 12) of the trailing group.
6. An implement as claimed in claim 5, characterized in that the rake members (4, 5) of the leading group each have eleven tine arms and the rake members (11, 12) of the group disposed therebehind each have thirteen tine arms.
7. An implement as claimed in any one of the preceding claims, characterized in that each of the outer rake members (4, 5) of the leading group rakes the crop laterally into a swath which, seen in the direction of travel, will be located before the rake member (11, 12) arranged on the outer lateral side of a

group disposed therebehind.

8. An implement as claimed in any one of claims 3 - 7, characterized in that the running wheels (24) are located between the swaths created by the outer rake members of the leading group of rake members (4, 5). 5
9. An implement as claimed in any one of the preceding claims, characterized in that the implement is provided with a frame beam (1) extending substantially in the direction of travel. 10
10. An implement as claimed in claim 9, characterized in that the rake members of each group are fitted to a frame beam (2, 3, 13, 14) extending transversely to the direction of travel of the implement, which frame beam is fitted to the frame beam (1) extending in the direction of travel. 15
11. An implement as claimed in any one of the preceding claims, characterized in that, for being brought into a transport position, the rake members (4, 5, 11, 12) are preferably foldable up about pivotal axes (29, 30, 31, 32) orientated in the direction of travel. 20 25

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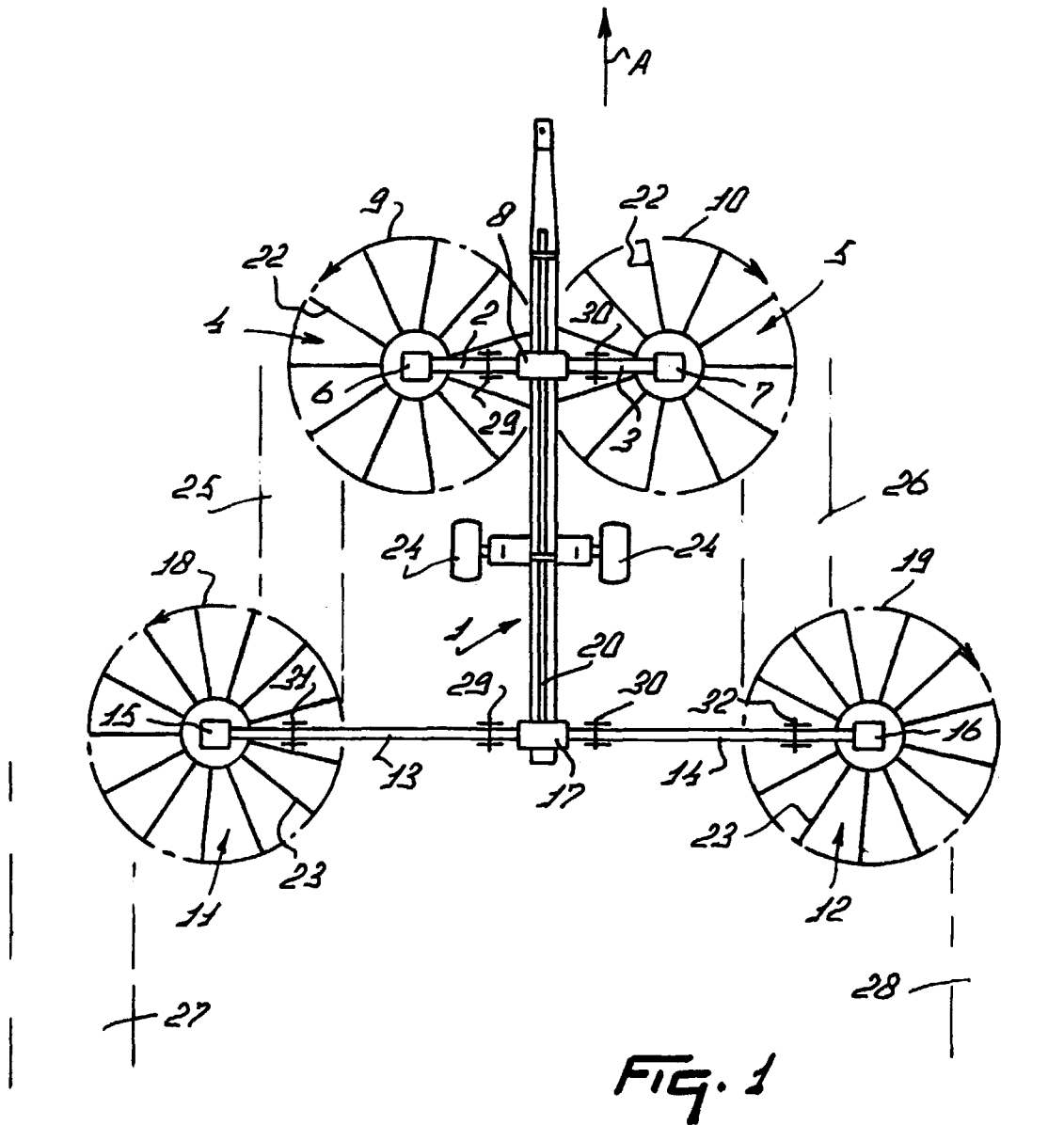
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Application Number
EP 99 20 1435

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 August 1999	Examiner De Lameillieure, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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